

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: Not yet assigned
Filing Date: Herewith
Applicant: Sandbach, et al.
Title: FOLDABLE ALPHA NUMERIC KEYBOARD
Attorney Docket: 9637-000035

Box PCT
Hon. Commissioner of Patents and Trademarks
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

Applicant herewith submits this Preliminary Amendment to the application filed herewith, for consideration prior to the calculation of the filing fee, as follows:

IN THE SPECIFICATION

Please delete the title of the invention as filed and replace it with:

FOLDABLE ALPHA NUMERIC KEYBOARD

Applicant includes herewith an Attachment for Specification Amendment showing a marked up version of the amendment to the title.

IN THE ABSTRACT

Please amend the Abstract to include reference numerals in accordance with the following rewritten Abstract in clean form. Applicant includes herewith an Attachment

for Claim Amendments showing a marked up version of the amendments to the Abstract.

ABSTRACT OF THE DISCLOSURE

The present invention relates to a foldable alpha numeric keyboard device (2301) configured to input data items into a computer or similar processing device (2307). The keyboard device comprises a first electrically conductive fabric sheet, a second electrically conductive fabric sheet and an interface circuit configured to supply voltages to and receive outputs from said keyboard. In addition; the keyboard is configured to produce an output in response to a mechanical interaction and the interface circuit is arranged to respond to the mechanical interaction and to provide a data item to a computer or similar processing device.

IN THE CLAIMS

Please amend Claims 3, 5, 6, 10 – 12, 14 – 18, 20 – 21, 22 and 24, in accordance with the following rewritten claims in clean form. Applicant includes herewith an Attachment for Claim Amendments showing a marked up version of each amended claim.

3. (Amended) A foldable alpha-numeric keyboard device according to claim 2, wherein said keyboard further comprises a central conductive layer disposed between the first and second conductive layers, said central conductive layer having a conductance that increases as it is placed under pressure and allowing conduction between said first layer and said second layer in response to a mechanical interaction.

5. (Amended) a foldable alpha-numeric keyboard device according to claim 1, wherein said keyboard further comprises at least one electrically insulative masking layer disposed between said first electrically conductive fabric sheet and said second electrically conductive fabric sheet, said masking layer defining a plurality of holes through which electrical contact between first electrically conductive fabric sheet and a second electrically conductive fabric sheet can occur.

6. (Amended) a foldable alpha-numeric keyboard device according to claim 1, wherein a plurality of key outlines are defined on said keyboard device, and said keyboard device includes a number of key registration devices configured to assist compression of said fabric layers within a particular one of said key outlines.

10. (Amended) A foldable alpha-numeric keyboard device according to claim 9, wherein each of said key registration devices has a dome-like configuration and when under pressure, each said key registration device deforms inwardly from a first position until at a second position resistance to deformation is suddenly reduced, while on release of said pressure said key registration device returns to its dome-like configuration.

11. (Amended) A foldable alpha-numeric keyboard device according to claim 9, wherein a key registration device is located above said plurality of fabric sheets and

said key registration device includes a base having a surface for attachment to one of said fabric sheets and a pressure focusing means, wherein said pressure focusing means is configured to apply a force to an area of said sheets when said key registration device is under pressure, and said pressure focusing means is configured such that said area is smaller than said base attachment surface.

12. (Amended) A foldable alpha-numeric keyboard device according to claim 2, wherein said first of said fabric sheets includes conducting yarns electrically grouped to define a plurality of conducting rows, said second of said fabric sheets includes conducting yarns electrically grouped to define a plurality of conducting columns and the intersections of said rows and columns define separate regions of said keyboard device.

14. (Amended) A foldable alpha-numeric keyboard device according to claim 12, wherein said interface circuit is configured to apply a voltage across a particular one of said regions and to provide an output indicative of the position of the mechanical interaction within said particular region.

15. (Amended) A foldable alpha-numeric keyboard device according to claim 12, wherein said interface circuit is configured to apply a voltage across a larger region defined by a plurality of said separate regions and to provide an output indicative of the position of the mechanical interaction within said larger region.

16. (Amended) A foldable alpha-numeric keyboard device according to claim 14, wherein at least one of said separate regions corresponds to a plurality of different keys and a plurality of said separate regions each correspond to one key only.

17. (Amended) A foldable alpha-numeric keyboard device according to claim 12, wherein said first fabric layer includes conductive fibres extending in a first direction and non-conducting fibres extending in a second direction, said second fabric layer includes conductive fibres extending in a third direction and non-conducting fibres extending in a fourth direction, such that said third direction is different to said first direction.

18. (Amended) A foldable alpha-numeric keyboard device according to claim 2, wherein said interface circuit has two electrical connections only to each of said first and second conducting layers.

20. (Amended) A foldable alpha-numeric keyboard device according to claim 18, wherein said electrical connections are made to opposing edges of said first conductive layer and to opposing edges of said second conductive layer.

21. (Amended) A foldable alpha-numeric keyboard device according to claim 18, wherein said interface circuit includes

a voltage supply means configured to apply a voltage across said first conducting

layer;

a voltage measurement means configured to measure a first voltage;

a voltage supply means configured to apply a voltage across said second
conducting layer;

a voltage measurement means configured to measure a second voltage; and

output means configured to provide an output dependent on said first and second
voltages, indicative of the position of said mechanical interaction.

22. (Amended) A foldable alpha-numeric keyboard device according to claim
1, wherein said device provides an output indicative of the pressure applied by said
mechanical interaction.

24. (Amended) A foldable alpha-numeric keyboard device according to claim
22, wherein, in response to a mechanical interaction, two measurements are made
representing said resistance between the first and second electrically conductive layers
of the keyboard and an output indicative of a mechanical interaction is provided.

REMARKS

Claims 3, 5, 6, 10 – 12, 14 – 18, 20 – 21, 22 and 24 have been amended. Claims 1 – 2, 7 – 9, 13, 19 23 and 25 remain unchanged. After acceptance of this Amendment, Claims 1 through 25 will remain pending in the current application. The purpose of this preliminary amendment is to clarify language and remove multiple dependent claims from the application to reduce filing costs . Consideration of the application as amended is requested.

Respectfully submitted,

Date: Nov 29, 2001

Harness, Dickey & Pierce, P.L.C.
P.O. Box 828
Bloomfield Hills, MI 48303
(248) 641-1600

By: Gregory A. Stobbs
Gregory A. Stobbs, Reg. No. 28764
Attorney for Applicant

ATTACHMENT FOR AMENDMENT TO THE SPECIFICATION

TITLE

The following is a marked up version of the amended title in which underlines indicates insertions and brackets indicate deletions.

[Data Input Device]

FOLDABLE ALPHA NUMERIC KEYBOARD

ATTACHMENT FOR AMENDMENT TO ABSTRACT

The following is a marked up version of the amended Abstract in which underlines indicates insertions.

ABSTRACT OF THE DISCLOSURE

The present invention relates to a foldable alpha numeric keyboard device (2301) configured to input data items into a computer or similar processing device (2307). The keyboard device comprises a first electrically conductive fabric sheet, a second electrically conductive fabric sheet and an interface circuit configured to supply voltages to and receive outputs from said keyboard. In addition; the keyboard is configured to produce an output in response to a mechanical interaction and the interface circuit is arranged to respond to the mechanical interaction and to provide a data item to a computer or similar processing device.

ATTACHMENT FOR CLAIM AMENDMENTS

The following is a marked up version of each amended claim in which underlines indicates insertions and brackets indicate deletions.

CLAIMS

3. (Amended) A foldable alpha-numeric keyboard device according to claim 2, wherein said keyboard further comprises a central conductive layer disposed between the first and second conductive layers, said central conductive layer having a conductance that increases as it is placed under pressure and allowing conduction between said first layer and said second layer[s] in response to a mechanical interaction.

5. (Amended) a foldable alpha-numeric keyboard device according to [any of] claim[s] 1 [to 4], wherein said keyboard further comprises at least one electrically insulative masking layer disposed between said first electrically conductive fabric sheet and said second electrically conductive fabric sheet, said masking layer defining a plurality of holes through which electrical contact between first electrically conductive fabric sheet and a second electrically conductive fabric sheet can occur.

6. (Amended) a foldable alpha-numeric keyboard device according to [any of] claim[s] 1 [to 5], wherein a plurality of key outlines [is] are defined on said keyboard

device, and said keyboard device includes a number of key registration devices configured to assist compression of said fabric layers within a particular one of said key outlines.

10. (Amended) A foldable alpha-numeric keyboard device according to claim 9, wherein each of said key registration devices has a dome-like configuration and when under pressure, each said key registration device deforms inwardly from a first position until at a [certain] second position resistance to deformation is suddenly reduced, while on release of said pressure said key registration device returns to its dome-life configuration.

11. (Amended) A foldable alpha-numeric keyboard device according to claim 9 [or claim 10], wherein a key registration device is located above said plurality of fabric sheets and said key registration device includes a base having a surface for attachment to one of said fabric sheets and a pressure focusing means, wherein said pressure focusing means is configured to apply a force to an area of said sheets when said key registration device is under pressure, and said pressure focusing means is configured such that said area is smaller than said base attachment surface.

12. (Amended) A foldable alpha-numeric keyboard device according to [any of] claim[s] 2 [to 11], wherein said first of said fabric sheets includes conducting yarns electrically grouped to define a plurality of conducting rows, said second of said fabric

sheets includes conducting yarns electrically grouped to define a plurality of conducting columns and the intersections of said rows and columns define separate regions of said keyboard device.

14. (Amended) A foldable alpha-numeric keyboard device according to claim 12 [or claim 13], wherein said interface circuit is configured to apply a voltage across a particular one of said regions and to provide an output indicative of the position of the mechanical interaction within said particular region.

15. (Amended) A foldable alpha-numeric keyboard device according to claim 12, [or claim 13] wherein said interface circuit is configured to apply a voltage across a larger region defined by a plurality of said separate regions and to provide an output indicative of the position of the mechanical interaction within said larger region.

16. (Amended) A foldable alpha-numeric keyboard device according to [any of] claim[s] 14 [to 15], wherein at least one of said separate regions corresponds to a plurality of different keys and a plurality of said separate regions each correspond to one key only.

17. (Amended) A foldable alpha-numeric keyboard device according to [any of] claim[s] 12 [to 16], wherein said first fabric layer includes conductive fibres extending in a first direction and non-conducting fibres extending in a second direction, said

second fabric layer includes conductive fibres extending in a third direction and non-conducting fibres extending in a fourth direction, such that said third direction is different to said first direction.

18. (Amended) A foldable alpha-numeric keyboard device according to [any of] claim[s] 2 [to 11], wherein said interface circuit has two electrical connections only to each of said first and second conducting layers.

20. (Amended) A foldable alpha-numeric keyboard device according to claim 18 [or claim 19], wherein said electrical connections are made to opposing edges of said first conductive layer and to opposing edges of said second conductive layer.

21. (Amended) A foldable alpha-numeric keyboard device according to [any of] claim[s] 18 [to 20], wherein said interface circuit includes

a voltage supply means configured to apply a voltage across said first conducting layer;

a voltage measurement means configured to measure a first voltage;

a voltage supply means configured to apply a voltage across said second conducting layer;

a voltage measurement means configured to measure a second voltage; and

output means configured to provide an output dependent on said first and second voltages, indicative of the position of said mechanical interaction.

22. (Amended) A foldable alpha-numeric keyboard device according to [any of] claim[s] 1 [to 21], wherein said device provides an output indicative of the pressure applied by said mechanical interaction.

24. (Amended) A foldable alpha-numeric keyboard device according to claim 22, wherein, in response to a mechanical interaction, [a] two measurements are made representing said resistance between the first and second electrically conductive layers of the keyboard and an output indicative of a mechanical interaction is provided.

09580239.1.12501